CONTROL OF APHIDS

UNIVERSITY
OF MICHIGAN

JUL 19 1956

MAIN
READING ROOM

HEARING

BEFORE THE

SPECIAL SUBCOMMITTEE ON APHID INFESTATION

OF THE

COMMITTEE ON AGRICULTURE HOUSE OF REPRESENTATIVES

EIGHTY-FOURTH CONGRESS

SECOND SESSION

ON

H. R. 10502, 10506, 10513, 10515, 10543, and 10639

APRIL 24, 1956

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CONTENTS

	Page
H. R. 10502. A bill to provide for control of destructive aphids	1
H. R. 10506. A bill to provide for the control of destructive aphids	2
H. R. 10513. A bill to provide for the control of destructive aphids	2
H. R. 10515. A bill to provide for the control of destructive aphids	2
H. R. 10543. A bill to provide for the control of destructive aphids	3
H. R. 10639. A bill to provide for the control of destructive aphids	3
Statement of—	
Edmondson, Hon. Ed, a Representative in Congress from the State of Oklahoma	4
Fernandez, Hon. Antonio M., a Representative in Congress from the State of New Mexico	31
Hawkins, Dr. Louis E., director, Oklahoma Agricultural Experiment Station, Stillwater, Okla	27
Scott, Kenneth, Director, Agricultural Credit, Department of Agriculture	22
Shaw, Dr. D. T., Administrator, Agricultural Research Service; accompanied by Dr. M. R. Clarkson, Deputy Administrator for Regulatory Programs, and Dr. E. S. Knipling, Chief, Entomology Research Service, Department of Agriculture	6
Wickersham, Hon. Victor, a Representative in Congress from the State of Oklahoma	32
Additional data submitted to the subcommittee:	
Brown, Shawnee, director, cooperative extension work in agriculture and home economics, Stillwater, Okla., letter of April 21, 1956, to Hon. Carl Albert	29

CONTENTS

Page

H. R. 10502. A bill to provide for control of destructive rabbits 1
H. R. 10506. A bill to provide for the control of destructive rabbits 1
H. R. 10513. A bill to provide for the control of destructive rabbits 1
H. R. 10518. A bill to provide for the control of destructive rabbits 1
H. R. 10519. A bill to provide for the control of destructive rabbits 1
H. R. 10520. A bill to provide for the control of destructive rabbits 2
Statement of—
Edmondson, Hon. Ed, a Representative in Congress from the State of Oklahoma 4
Jarmodes, Hon. Antonio M., a Representative in Congress from the State of New Mexico 31
Hawkins, Dr. Louis E., director, Oklahoma Agricultural Experiment Station, Stillwater, Okla 37
Scott, Kenneth, Director, Agricultural Credit, Department of Agriculture 39
Shaw, Dr. T. Abdulnaterian, Agricultural Research Service, cooperating Dr. M. H. Clarkson, Deputy Administrator for Plant Protection and Dr. P. S. Kolpling, Chief, Entomology Research Service, Department of Agriculture 3
Wickersham, Hon. Victor, a Representative in Congress from the State of Oklahoma 32
Additional data submitted to the subcommittee:
Brown, Shawnee, director, cooperative extension work in agriculture and home economics, Stillwater, Okla., letter of April 21, 1959, to Hon. Carl Albert 39

DEPOSITED BY THE
UNITED STATES OF AMERICA

CONTROL OF APHIDS

TUESDAY, APRIL 24, 1956

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE OF THE COMMITTEE ON AGRICULTURE,
Washington, D. C.

The subcommittee met, pursuant to call, at 10 a. m., in room 1310, New House Office Building, Hon. Carl Albert (chairman of the subcommittee), presiding.

Mr. ALBERT. The committee will please come to order.

This special subcommittee has been appointed by the vice-chairman of the committee after consultation with the chairman and the ranking member to investigate and go into the epidemic of spotted alfalfa aphids that are destroying the alfalfa crop in several sections of the country, according to data that has come to the committee.

Upon the request of alfalfa growers and others, I have introduced H. R. 10502 and have been joined in that by my colleague from Oklahoma on the committee, Mr. Belcher, who introduced H. R. 10506, and by our colleague, Mr. Harrison of Nebraska, H. R. 10513, and 3 of my colleagues from Oklahoma, Mr. Jarman, H. R. 10515, Mr. Steed, H. R. 10543, and Mr. Wickersham, H. R. 10639.

I think my colleague Mr. Edmondson has also introduced a bill, but I do not have a copy of it, H. R. 10512.

The bills will be inserted in the record at this point.

(The bills referred to are as follows:)

[H. R. 10502, 84th Cong. 2d sess.]

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State, or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

(b) In administering this section, the Secretary shall utilize the services of local, county, and State committees established under section 8 of the Soil Conservation and Domestic Allotment Act, as amended.

(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids and the effective control of destructive aphids.

[H. R. 10506, 84th Cong. 2d sess.]

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Federal Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

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(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids and the effective control of destructive aphids.

[H. R. 10513, 84th Cong., 2d sess.]

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State, or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

(b) In administering this section, the Secretary shall utilize the services of local, county, and State committees established under section 8 of the Soil Conservation and Domestic Allotment Act, as amended.

(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids and the effective control of destructive aphids.

[H. R. 10515, 84th Cong., 2d sess.]

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of

such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State, or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

(b) In administering this section, the Secretary shall utilize the services of local, county, and State committees established under section 8 of the Soil Conservation and Domestic Allotment Act, as amended.

(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids and the effective control of destructive aphids.

[H. R. 10543, 84th Cong., 2d sess.

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State, or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

(b) In administering this section, the Secretary shall utilize the services of local, county, and State committees established under section 8 of the Soil Conservation and Domestic Allotment Act, as amended.

(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids and the effective control of destructive aphids.

[H. R. 10639, 84th Cong., 2d sess.]

A BILL To provide for the control of destructive aphids

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) whenever the Secretary of Agriculture determines that infestation by spotted alfalfa aphids is causing serious damage to crops in any area and that a sufficient number of farmers in such area will participate in a program under this Act to effectuate the substantial suppression of such infestation, the Secretary may furnish insecticides and other materials to farmers in such area to aid in the suppression of such infestation. The Secretary may make such materials available by direct grant or by making payments to (1) farmers applying such materials, (2) Federal, State, or local government agencies furnishing such materials, or (3) persons who fill purchase orders for such materials. The price at which purchase orders for any such materials are filled may be limited, if the Secretary determines that it is necessary in the interest of producers and the Government, to a fair price fixed in accordance with regulations prescribed by the Secretary.

(b) In administering this section, the Secretary shall utilize the services of local, county, and State committees established under section 8 of the Soil Conservation and Domestic Allotment Act, as amended.

(c) There are hereby authorized to be appropriated to carry out the provisions of this section such amounts as may be necessary therefor. The amount appropriated under this subsection for the fiscal year ending June 30, 1956, shall not exceed $15,000,000.

SEC. 2. There is hereby authorized to be appropriated the sum of $5,000,000 annually, in addition to other amounts available, for research on aphids, and the effective control of destructive aphids.

Mr. ALBERT. I invite my colleagues to participate in this hearing if they wish to do so.

Mr. EDMONDSON. Mr. Chairman, I wonder if I might put a statement in the record at this time.

Mr. ALBERT. Without objection, so ordered.

STATEMENT OF HON. ED EDMONDSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. EDMONDSON. Mr. Chairman, I appreciate this opportunity to be heard on a matter of the gravest importance to Oklahoma farmers and the farmers of the Nation, and I congratulate the Committee on Agriculture for the promptness with which it has acted to schedule hearings on the bills for control of the spotted alfalfa aphid.

Just 8 days ago, on Monday, April 18, I called the attention of the House to the growing menace of this insect, and described it as "a billion-dollar danger." That figure was based upon the total value of the alfalfa crop of this country in 1955, which was $1,230,895,000, and upon the stated conclusion of some experts that the aphid could easily destroy this entire crop, if not brought under early control.

At that time, Mr. Chairman, just 8 days ago, entomologists of Oklahoma were estimating the probable crop loss in Oklahoma alone during 1956 at $16 million. That would represent approximately one-half of the estimated crop value in our State, where we have 646,000 acres in alfalfa, and estimate an average yield of 2 tons per acre.

Last night, Mr. Chairman, in an effort to get the latest available figures and estimates of damage from the aphid, I telephoned one of our State's leading farm authorities, Shawnee Brown of Oklahoma A. and M. College, who has been following closely the spread of the aphid invasion.

Mr. Brown told me that one-third of Oklahoma's alfalfa crop has already been destroyed, and practically all of it plowed under, since the aphid destroys the plant itself, and reseeding must follow its successful attack on a crop. He said we have suffered damage of 35 to 40 percent on what remains of our fine alfalfa crop, with the result that farm experts have now increased the estimates of crop loss in Oklahoma to between $18 million and $20 million during 1956.

The most tragic part of the picture, Mr. Chairman, is that this national infestation is heaviest in the drought-hit areas of our country, where many farmers are financially unable to pay the bill for control measures, which cost around $2 per acre or more, if an effective poison is sprayed by plane to kill the aphids.

The difficulty is that from 3 to 8 sprayings may be necessary under existing conditions, for reinfestation can take place in a short time, especially in view of the fact that only part of the farmers are able to spray.

Unless all farmers in an infested area join in control measures, spraying by a portion of the farmers is therefore of doubtful value.

I am told that a crop completely cleared by spraying in 1 week may be completely reinfested by a neighboring field 8 or 10 days later.

Mr. Chairman, the emergency control bill introduced by most of the Members of the Oklahoma delegation, and joined in by Congressman Harrison of Nebraska, would provide authority to the Secretary of Agriculture to furnish insecticides and other infestation. The Secretary could make such materials available by direct grant or by making payments to:

(1) Farmers applying such materials;

(2) Federal, State or local government agencies furnishing such materials;

(3) Persons who fill purchase orders for such materials.

The price at which purchase orders for any such materials are filled could be limited by the Secretary on his determination that the interest of producers and the Government requires establishment of a fair price.

The bill would authorize appropriation in this fiscal year of not to exceed $15 million to meet this emergency need, and such amounts as might be necessary thereafter. It also authorizes appropriation of $5 million annually, in addition to other amounts available, for research on aphids and the effective control of aphids.

Mr. Chairman, the research provision is in the bill because it is conceded by entomologists that we do not yet have the answer to the aphid danger.

In Oklahoma, we believe spraying offers the best emergency measure, and the best chance of salvaging some economic value in a disastrous situation for our farmers.

I urge the favorable report of one of these emergency bills, as soon as possible, by this great committee.

Mr. ALBERT. The Chair has been requested to go into this matter from two different points of view:

First, the question of control of the pest and research. It is to those aspects of the problem that these various bills have been introduced.

The Chair has also been requested to go into the matter of the impact of this destruction of the alfalfa hay crop on dairy and other cattle feeders, looking toward the possibility that we might have to come to the Department of Agriculture for assistance somewhat in the nature of drough assistance which was extended during the drougth.

We have representatives here from the Department of Agriculture to discuss both phases of the problem.

On the first phase, we have Dr. D. T. Shaw, Administrator, Agricultural Research Service, who is accompanied by Dr. M. R. Clarkson, Deputy Administrator for Regulatory Programs, Agricultural Research Service, and Dr. E. S. Knipling, Chief of Entomology Research Service.

Then, on the other phase of the matter, we have Mr. Kenneth L. Scott, Director, Agricultural Credit.

Now, I would like to ask Dr. Shaw and his colleagues to present their side of the problem.

78894—56——2

STATEMENT OF DR. D. T. SHAW, ADMINISTRATOR, ACCOMPANIED BY DR. M. R. CLARKSON, DEPUTY ADMINISTRATOR FOR REGULATORY PROGRAMS, AGRICULTURAL RESEARCH SERVICE, AND DR. E. S. KNIPLING, CHIEF OF ENTOMOLOGY RESEARCH SERVICE, DEPARTMENT OF AGRICULTURE

Dr. SHAW. Mr. Chairman and gentlemen of the subcommittee, as you have stated, I have Dr. Clarkson and Dr. Knipling here with me in case there are questions that I am unable to answer.

We in the Department sincerely appreciate the opportunity you have given us to discuss the spotted alfalfa aphid.

The spotted alfalfa aphid was first discovered in the United States in 1954 in New Mexico. It has not been determined where it came from. Later in 1954 it was found in Arizona and California.

At first it was confused with the yellow clover aphid which was already common in the United States, and it was not until some time later that it was definitely determined that we were dealing with a new insect.

In 1955 it was found in 11 additional States, all west of the Mississippi River.

This year new infestations have been found in the original area and we now have one report of its occurrence in Florida. It will probably spread over the entire alfalfa area.

In 1955 this aphid caused severe damage in California, since it attacks the alfalfa plant at any stage of growth. It has been estimated that it may cause a loss of $13 million to the alfalfa crop in the Southwestern States in 1956.

Early reports indicate that in some areas the damage is not so severe at this time as it was last year. In other areas, such as Utah, Oklahoma, and Texas, the indications are that the damage is much more severe than in 1955.

Alfalfa is the primary host plant of the spotted alfalfa aphid. However, it has been found on other plants, such as burr clover, sweetclover, and sourclover. The infestation on these other plants is important only as a source of spread of the insect. Nearly all of the aphids are female and the largest proportion is winged.

There is a report that this spring aphids have been captured 5,000 feet above the ground in Kansas. This indicates that they can be blown for many miles. They give birth to living young and fertilization is unnecessary for reproduction.

The length of the life cycle varies from 15 to 20 days, which means that there can be from 12 to 20 generations in a year. The productive period of the female is apprximately 20 days.

The aphid attacks the plant at all stages of growth. The damage to young plants can be so severe as to cause the stand to be abandoned. Yields of hay are reduced, and heavy infestations cause a poor quality of hay.

The spotted alfalfa aphid can be controlled on alfalfa by the use of organic phosphates such as malathion, parathion and the chlorinated hydrocarbons such as DDT and toxaphene.

Under most conditions chemical control is fairly satisfactory, although there is some indication that in certain areas poor control

has been obtained this spring. It is necessary to apply the chemicals rather frequently and from 1 to 2 applications may be required for each cutting of alfalfa, and as many as 7 for a seed crop. Each treatment costs from $1.50 to $4 per acre, depending upon the chemical used and the method of application.

Biological control, including parasites, predators, and possibly insect diseases, is being started. One of the natural enemies of the aphid is the ladybird beetle and, when present in sufficient numbers, does a great deal in keeping the infestation under control Some new natural enemies are being released in California and other parts of the country.

The other method of control is the use of resistant varieties and at the present time the variety Lahontan, which was developed in Nevada from experiments cooperative between the Agricultural Research Service and the Nevada Agricultural Experiment Station, is available.

It is estimated that by the fall of 1956, about 2 million pounds of seed of Lahontan will be available.

As soon as we became aware of the seriousness of this insect, shifts were made in research funds in order to find methods of control because it is felt that vigorous research program is the answer to the problem.

Between November 1954 and May 1955, work was started at Tempe, Ariz., and also our biological control laboratory in France was advised to search for parasites and predators. Our laboratory at Beltsville began studying aphids on alfalfa in the east, and at Lincoln, Nebr., certain investigations were initiated.

The research program, which is conducted cooperatively with the various State agricultural experiment stations, is being accelerated along three principal lines.

The first is in the search of new insecticides, especially those of the systemic type which might be used against the aphid. The effect of these insecticides on the aphid's insect enemies is also to be investigated. At the present time the chemicals that are available kill not only the aphids but also the enemies. It is altogether possible that cheaper chemicals can be found.

Secondly, the program in biological control is also being increased. Our explorers are working in France and India searching for insect parasites and natural enemies of the aphid.

The California Agricultural Experiment Station has workers in Egypt, Israel and Italy. So far, we have introduced some 4,000 samples of these parasites and predators and some of them have been released in California. It is too early to make any evaluation of the success of this progam.

And last, work is also being accelerated in the case of resistant varieties.

As mentioned before, the variety Lahontan carries considerable resistance to this insect. Unfortunately, Lahontan is not universally adapted to all of the alfalfa areas in the United States. It is being tested in various localities and possibly its adaption is wider than first thought.

Another source of resistance is known as C–32. This is a clonal line from an F_1 hybrid of rather complex parentage.

A third source of resistance is from a variety known as African.

There are probably other sources of resistance but these have not been fully explored. There is some evidence that such varieties as Vernal, Ranger, and Buffalo, and possibly others, do have some resistant plants within the overall population. The latest breeding techniques will be used to transfer this resistance to varieties adapted to different areas of the country. In some cases the backcross method will be used, which will speed up the work considerably.

In all of our cooperative breeding programs resistance to the spotted alfalfa aphid will be added to the list of desired characteristics of any new varieties. Although varietal resistance is probably the final answer to the problem, it will take from 3 to 5 years to develop varieties having resistance combined with acceptable agronomic characteristics.

In the current fiscal year, through the shift of regular funds and the use of emergency funds, a total of $91,500 is available for entomological and $9,500 for plant breeding work.

In the 1957 budget now before the Congress, there are included requests which, if approved, will make available $28,000 additional for entomological work and $45,000 for plant breeding. This will give a total of $174,000 for the fiscal year 1957.

It is our feeling that our present program, together with the plans we have for fiscal year 1957, will be sufficient to answer the problems that have arisen.

We have had an opportunity to study the bills which would provide authority for the Department to participate in the cost of controlling destructive aphids. After carefully considering the many phases of this problem, it has been concluded that the functions of the Federal Government should be limited to developing methods and techniques that farmers can use in controlling this pest, and that the Department should not assume financial obligations for any part of the actual control costs.

In other words, the Department should not, as a matter of national policy, assume obligations for production costs that traditionally have been borne by the farmer.

In arriving at this conclusion, a number of factors have been considered, including ways by which a pest of this kind moves from one field to another and before it was identified as a species different from the very closely related yellow clover aphid which for many years has been widely distributed in the eastern part of the United States without causing any great amount of damage.

As indicated earlier, the alfalfa aphid was first found in New Mexico in 1954. Later in the same year it became quite quite widely distributed in Arizona and California.

In 1955 it appeared in 11 more States, making a total of 14, all west of the Mississippi. The alfalfa aphid has been trapped at elevations of 5,000 feet. It multiplies fast, is capable of traveling hundreds of miles with the wind, and a single specimen can start a new colony.

Entomologist who have studied this group of insects are convinced that in a very short time it will infest all alfalfa areas in the country, regardless of controls that may be applied.

It is anticipated, however, that the intensity of the current outbreak will subside to a considerable extent as native natural enemies, and those to be introduced, increase in number.

If the Federal Government were to furnish insecticides in accordance with the provisions of these bills, the cotton farmer who must

combat periodic outbreaks of various cotton pests, fruit and vegetable growers who look upon pest control as a major item of production cost, and the man who must protect his corn from corn borer, would all be entitled to similar consideration. The cost to the Federal Government would be tremendous.

In dealing with crop pests that are native to or widely distributed in this country, the Department, in line with existing agreements with the States, conducts research leading to improved methods of control. Federal grants are made to State experiment stations for work of this kind, in addition to investigations carried on by the Agricultural Research Service at Federal laboratories and in cooperation with State experiment stations.

The information thus developed is made available to farmers through the facilities of the Agricultural Extension Service. Except when prevention of spread or the eradication of an introduced pest is the objective, the cost of acquiring and applying control treatments have traditionally remained a responsibility of the individual farmer.

Some years ago the Federal Government furnished grasshopper and Mormon cricket bait free of charge to farmers. At that time severe outbreaks were developing on the extensive semiarid grasslands and abandoned farmlands of the West and from there migrating into the farm areas. Treatments available at the time were not effective when applied on an individual property basis, and there was no effective way of combating infestations that developed on the extensive range area involved.

Since then research has developed new and much improved treatments that may be applied as sprays or dusts directly to the crops to be protected and farmers now assume the full cost of the insecticides and either apply them with their own equipment or engage commercial operators to do it for them. Federal assistance in the actual cost of controlling grasshoppers is now limited to some assistance in the suppression of outbreaks on rangelands to prevent such areas from contributing to general epidemics and the migrations that are likely to develop under such circumstances.

In formulating plans to deal with this problem, the Department has had the benefit of advice from both State and Federal research workers.

On February 6, representatives of the Department met with the Joint Legislative Committee on Agriculture and Livestock Problems in the State of California, at Merced for an on-the-ground review of the situation in the Imperial Valley. This group concluded that to contain or eradicate this pest, in view of the extent of areas then infested, would be impossible, and that the use of public funds should be limited to an aggressive program of research leading to improved methods and techniques for control which the farmers themselves could use as needed.

We have just been advised that on April 30 and May 1 in Kansas City, Mo., there is to be a conference to discuss this very serious problem. This conference will be attended by State and Federal workers from such States as Nebraska, Kansas, Oklahoma, Missouri, and Arkansas, who will get together and discuss the situation and come up with plans for carrying out a coordinated research program. It is known that various States are shifting funds to work on this problem.

For example, it is reported that California is spending about $60,000 a year on the problem, and we know that Arizona has assigned research and extension men to the problem.

Other States, such as New Mexico, Kansas, and Oklahoma, are assigning men to this problem. It will only be by coordinated attack that quick results can be obtained.

I wish again to assure this subcommittee that the Department intends to exhaust every possibility in its search for an effective and economical control for this destructive pest.

Mr. ALBERT. We thank you, Dr. Shaw, for your statement.

Before I ask any questions, I will be glad to yield to Mr. Hope.

Have you any questions at this time?

Mr. HOPE. Mr. Chairman, if you do not mind, I have one or two to ask.

In particular, you speak of immune varieties and the development of further immune varieties. What is there about these particular varieties that renders them immune to damage from this pest?

Dr. SHAW. We do not know specifically what the factors are. It is undoubtedly in the chemical composition of the plant that makes it so that they are not an encouragement to aphids.

Mr. HOPE. You mean the aphids will not attack these particular varieties or particular plants of certain varieties.

Dr. SHAW. Not attack them to do any damage; yes, sir.

It is a similar situation to what we have when we develop a variety to resist rust or any of the other things.

Mr. HOPE. You feel, then, that proceeding on the same theory that you are now, namely, that the Federal Government should not undertake the work of exterminating the pest or assisting farmers in carrying out control methods, that you do have sufficient money in sight through the Federal Government and States to do whatever is necessary in the field of research.

Dr. SHAW. We think so.

Now, on a breeding program, you can only move so fast and we are going to have this incorporation of resistance in every one of our alfalfa breeding programs in the United States so that we think we will do everything that we can.

Mr. HOPE. Of course, there have been other pests in the past, however, where we have had direct assistance like the pink bollworm. Also in the early days of the corn borer we had a direct Federal program of extermination where I think all expenses were borne by the Federal Government and the farmers were compensated for the crops that they lost because of the destruction of the crop as an eradication measure.

I remember we had the Mediterranean fruitfly in Florida a few years ago, where we had a similar program in effect. But I take it you do not think this comes within the field where these other programs would serve as a precedent that we ought to follow in this particular situation.

Dr. SHAW. In the case of the Mediterranean fruitfly we had at the time that it was infesting the country in Florida, we felt that we could eradicate it from the United States and we did, through our efforts to eradicate it and prevent its spread to many other areas, we felt that that was a case where the Federal Government was perfectly justified in getting in and stopping this thing at its source and preventing the damage that would be done in other areas.

In the case of the pink bollworm, we have had an effort that has been attempting to prevent the spread of the pink bollworm to other areas, and we thought we had a chance in that area of holding the

spread to a limited area and we hope eventually we can push it back and maybe get rid of it.

But in this case we do not see any possibility whatever of preventing this spread, no matter what we do, of this aphid because it is blown by the wind for hundreds of miles and, as I indicated in my statement, the female, and most all of them are females, produce without fertilization so that one single aphid blown by the wind that lights down over here some hundreds of miles away, is all that is needed to start a new colony; whereas, with normal insects, you would have to have at least two of them in the same place.

So we cannot conceive of how we are going to prevent this from spreading and we are going to have to then learn to live with it, and we think that our function is to develop the most effective means that we can to give to the farmer so that they can learn to live with it.

We are quite confident that the final solution is this resistant variety and, in the meantime, we are doing all we can in insecticides and natural enemies.

Mr. HOPE. Use of insecticides such as you describe here would be a pretty expensive proposition, would it not?

You really need to find something better, do you not?

Dr. SHAW. I suppose on an average that you could say it is going to cost about $10 an acre a year with insecticides for control. When we can get the resistant variety, then the farmer just uses that seed instead of other seed, and he does not have that expense.

Mr. HOPE. You do feel quite encouraged, I take it from what you say, that you are going to be able to eventually develop resistant varieties which will do well in all parts of the country where alfalfa is grown?

Dr. SHAW. We feel quite confident on that, Mr. Hope, due to the fact that we have one that is resistant, you see. We have one that is now resistant, so it is a case of taking that characteristic out of that plant and transferring it to the other plants and we think we can do it.

Mr. HOPE. How long a period of time would that take?

Dr. SHAW. I have estimated here from 3 to 5 years but that is as optimstic as I can be. It will not be less than that.

Mr. HOPE. That is all.

Mr. ALBERT. Do you have any questions, Mr. Thompson?

Mr. THOMPSON. No questions.

Mr. ALBERT. Mr. Hill?

Mr. HILL. I would like to ask a question or two.

Have our alfalfa fields in Colorado been infected with this?

Dr. SHAW. Yes; there is infestation in Colorado.

Mr. HILL. And then does it affect the irrigated fields or is it mostly dry lands?

Dr. SHAW. It would affect both.

Mr. HILL. And then another question:

What time of the year does it seem to be the worst, work the hardest, put it that way?

Dr. SHAW. It is very destructive throughout the full growing season.

Mr. HILL. Of course, alfalfa, you know in some areas you cut 3 times and some 4 times.

Do you have enough information to know which crop it likes the best?

Dr. SHAW. All of them.

Mr. HILL. All of them?

Dr. SHAW. In the areas where they have it, they are having to apply one or two spray applications for each crop.

Mr. HILL. Then another question.

How destructive, really, is it? Does it take the field out or just part of it?

Dr. SHAW. Well, without any treatment whatever, it can practically destroy the crop.

Mr. HILL. It kills the plant?

Dr. SHAW. It frequently does cause the death of the plant.

Mr. HILL. By that you mean the roots and all of the plant?

Dr. SHAW. Yes; when it gets that severe on young stands, it is particularly important.

I would like to ask Dr. Knipling to comment on that more particularly. He is our chief entomologist in the Department.

Dr. KNIPLING. It is especially severe on young seeded plants and where you have an aphid in considerable numbers or large numbers, it will kill out the stand. That is one of the problems in getting new stands of alfalfa going in this aphid-infested area.

In fact, it has a very, very virulent toxicant, and a single aphid on a real young alfalfa plant can do severe damage.

Mr. HILL. Including the root?

Dr. KNIPLING. Yes.

Mr. HILL. Then another question that seems important to me. Does this aphid affect—what shall I call them?—plants in this same category like sweetclover or any other types of nitrogen-producing plants such as alfalfa?

Dr. KNIPLING. It will get on a few of the other clover, but we have not observed any serious infestation in any of the other crops. It will reproduce on sourclover and some of the sweetclovers, but it is not of economic significance at this time.

Mr. HILL. One more question. What is your theory on how this insect originated? Did we import it on our alfalfa seed, or what?

Dr. KNIPLING. It would not come in with the seed. Actually, we do not know how it came in, but we feel that it probably came in from the Near East, Iraq or Iran, somewhere in that area, but we just do not know. It might have come in an airplane or someway like that.

Mr. HILL. Where did you first find that this enemy of alfalfa became widespread?

Dr. KNIPLING. It was first reported from New Mexico. Then it quickly spread to Arizona and California.

Mr. HILL. Was it near the airplane strips or bomber fields?

Dr. KNIPLING. Where it was first identified, we have no conclusive ideas as to just how it might have originated.

Mr. HILL. You are not ready to state, then, just exactly how it got started?

Dr. KNIPLING. We probably never will know.

Mr. HILL. And you do not have any idea how it multiplies and divides?

Dr. KNIPLING. Oh, yes; we do.

Dr. SHAW. Yes.

Dr. KNIPLING. We have good information on its life history in the areas where it has appeared.

Mr. HILL. You make a pretty bad statement here on page 5, Dr. Shaw. Listen to what he says, because it scares me, because we have had trouble enough with alfalfa, let along introducing a new pest:

> Entomologists who have studied this group of insects are convinced that in a very short time it will infest all alfalfa areas in the country, regardless of controls that may be applied.

Do you actually think it is as bad as that?

Dr. SHAW. Yes, sir. We know no way of preventing its spread to all the country. It is now in some 15 States and probably, within another year or two, will be in all of them.

Mr. HILL. I notice you also said it blows away like the thistle and wherever it stops it starts to work?

Dr. SHAW. Yes. That is the particularly troublesome part of it.

Mr. HILL. I yield to Mr. Hope.

Mr. HOPE. I get from what you said that the principal method by which this aphid is being spread is by flying in the wind. Is it possible to spread it through the hay? Do live specimens remain on the hay?

Dr. KNIPLING. It will not survive long on the hay. It needs a succulent plant.

Mr. HOPE. Where it spreads is by flying and action of the wind?

Dr. KNIPLING. That is the way. Of course, it could spread in a vehicle or other means, too, but we think the main spread is by air because, when they get heavily populated, when the fields become heavily populated, that stimulates the production of more aphids with wings and they start flying and let the wind drift them along. That is their inherent instinct for spreading.

Mr. HILL. You do not think, then, there is much danger of spreading in the feed lots or corrals or haystacks, but mostly when it is on the live plant?

Dr. SHAW. From the succulent live plant; yes.

Mr. HILL. Have you any idea how long it lives after it is blown away from the live plant?

Dr. KNIPLING. We do not know how long it will live in that manner.

Mr. HILL. In other words, if you carry it around on a vehicle, somewhere in the body or on the sides, and it starts to drop off, it might reproduce?

Dr. KNIPLING. Certainly within several hours or perhaps a day or so.

Dr. SHAW. It will not live long without some succulent plant for it to live on. If it is on a dry wagon or automobile without any plant material, it will not live very long.

Mr. LOVRE. Will the gentleman yield?

Mr. HILL. I think that is all the hard questions I can ask of him.

Mr. LOVRE. You stated that this infestation is principally in 15 or 18 States?

Dr. SHAW. Yes.

Mr. LOVRE. Are those the States where alfalfa is grown principally?

Dr. SHAW. Well, it started, as was said, in New Mexico, Arizona, and California, but it is now in Oklahoma and Kansas and other States of very large acreages of alfalfa, and it is just spreading into the alfalfa area.

Mr. LOVRE. How about in the Midwest? We have quite a bit of alfalfa there.

Dr. SHAW. It is getting up as far north as Nebraska and as far east as Missouri, but it will be in those other States next year.

Mr. LOVRE. How long have you been doing research on a resistant seed?

Dr. SHAW. We were fortunate in one circumstance, that we had just developed this new Lahontan variety that we were developing because of other problems, that it did resist the spotted alfalfa aphid. That was luck on our part, that it did, but we have then, since we knew we had the trouble and we had this one, we then started immediately last year to try to incorporate that in all of our other varieties.

Mr. LOVRE. With that one seed that you are experimenting with now, would that be adaptable to all States regardless of the climate, or do you have to have a special resistancy for each climatic condition?

Dr. SHAW. It was developed in Nevada for that surrounding area. It may be adapted further than what we have thought it would be. Essentially, what we have to do is to go into the different climatic areas and incorporate this factor into the varieties that do well in those areas. We cannot expect the Lahontan seed to provide us seed that we can use everywhere. We will have to develop new varieties for Oklahoma, Kansas, and so forth.

Mr. LOVRE. Now, with these aphids, how do you detect it first? Do they go to the leaf first or the stem, or how do you detect it first?

Dr. SHAW. I would like Dr. Knipling to answer that.

Dr. KNIPLING. Usually the reproducing forms are near the tips of the growing part of the alfalfa plant. As the young hatch, they migrate down into the more dense parts of the plant and feed on the leaves.

Mr. HILL. Will the gentleman yield?

Mr. LOVRE. Yes.

Mr. HILL. I forgot about crimson clover and ordinary red clover. Do they have any affinity or any love for that type of plant?

Dr. KNIPLING. No; they do not.

Mr. HILL. Just alfalfa?

Dr. KNIPLING. They will get on some of the others, as I mentioned, but they are not of economic significance on the other two that we have observed up to this point.

Mr. ALBERT. Do you have any questions, Mr. Belcher?

Mr. BELCHER. How destructive are they? When they move into a field, do they just completely destroy that field?

Dr. KNIPLING. If they are not treated, they will increase so rapidly, if it is a young stand they will kill it out in short order. If it is an older stand, they will increase to huge numbers and cause leaves to shatter.

They produce honeydew, which all aphids do, and that produces a mold and that is one of the problems that causes a stickiness in the alfalfa and it is difficult to harvest, the quality is reduced, in addition to lack of yield.

Dr. SHAW. They have counted as many as 4,000 of these to the square foot.

Mr. BELCHER. Supposing they attack the first crop in the spring and you cut that crop, then would they be likely to destroy each additional crop as they came along?

Dr. KNIPLING. Yes; without treatment.

Mr. BELCHER. When did you first notice this in New Mexico?

Dr. SHAW. 1954.

Mr. BELCHER. Have you ever been able to discover what other characteristic the other clovers have that resists them?

Dr. KNIPLING. We have not studied that but it is probably similar to what Dr. Shaw mentioned, the one variety of alfalfa which is resistant—either it is incompatible with the aphid; it does not furnish all of the essential requirements for the aphid.

Dr. SHAW. We are working on this problem of resistance to try to discover what it is, but so far we do not know why certain plants resist diseases and insests and others do not. We have been able to develop many wheats and many alfalfas and many crops that are resistant, but we do not know why. We are working on it. We think it would be a great boon to us if we could find out what it actually is that causes this resistance because then we would be in a far better state to go on with the work.

Mr. BELCHER. This variety which you say is resistant, that was developed in Nevada; how big a territory would that be adaptable to, that particular variety?

Dr. SHAW. Well, it ought to be adapted to the mountain area except the southern part, and it probably, in cases where they are having these infestations, will give them a better crop than other alfalfa even though it is not what we call adapted to that area.

As fast as we can develop this Lahontan seed, there will be plantings of Lahontan in most of these areas, but we are only going to have about 2 million pounds of seed of that variety available this fall and it is not near enough to go around. But just as fast as we can develop these other varieties, we will multiply the seed as rapidly as we can.

Mr. HOPE. Mr. Chairman?

Mr. ALBERT. Yes.

Mr. HOPE. What other varieties besides Lahontan have shown resistance?

Dr. SHAW. Well, the varieties that are in widespread use, like Ranger, have some plants within the variety in the field that we can pick out some plants that show resistance.

Mr. HOPE. You mentioned Buffalo also?

Dr. SHAW. Yes; Buffalo.

Now, the chances are that if these findings are borne out that we can pick those single plants and start from there and come along with development of seed that will be resistant.

Mr. HOPE. That will make it much easier to develop a variety?

Dr. SHAW. Yes.

Mr. HILL. Coming from New Mexico like it did, do the scientists have any feeling that this extreme drought for so many years might have had some effect on the production of those aphids?

Dr. SHAW. I doubt it.

Dr. KNIPLING. It is just a newly introduced pest which often develops that way without its natural enemies.

Mr. HILL. What is the history behind this alfalfa seed that is aphid resistant? Maybe the soil had something to do with it?

Dr. SHAW. We were developing an alfalfa for general disease resistance. That is what we were trying to do out there in Nevada, and this particular variety showed up very well against the diseases so that was the one that we went ahead and multiplied and developed.

Now, as I stated a little bit ago, it did happen to resist this aphid. We do not know why. We wish we did and we are going to work as hard as we can to try and find out, but we do not know.

Mr. HILL. But you did develop it in Nevada?

Dr. SHAW. Yes.

Mr. HILL. This is your own crossbred type of alfalfa seed?

Dr. SHAW. Yes; our service cooperated with the Nevada breeding station.

Mr. HILL. How widely spread is the sale of this seed?

Dr. SHAW. It is not too widespread at the present time. The variety had only recently been released and, as I estimated, the potential seed supply will not be more than 2 million pounds at the end of this year.

Mr. HILL. What area of the country is the seed produced in?

Dr. SHAW. Out there, and they will be growing some of it in California for the production of seed.

Mr. HILL. Have they tried any in the Colorado irrigated sections?

Dr. SHAW. I do not know that it has been tried there yet.

Do you know, Dr. Knipling?

Dr. KNIPLING. No.

Mr. BELCHER. This variety; have you experimented enough to know that it is completely resistant to it?

Dr. SHAW. It is completely resistant to the strain that we have. We cannot guarantee that it is going to remain that way.

We always have the problem with all of our plants that these insects and diseases develop new sports and new varieties just about as fast as we can develop the plants to resist them. It is a continual battle.

Mr. ALBERT. Dr. Shaw, I would like to ask you just a few questions to complete the record.

As I understand it, the Department is opposed to the bills that have been introduced on the subject; is that correct?

Dr. SHAW. Yes, sir.

Mr. ALBERT. Now, the next question; you state that there is no known way of determining how this pest was introduced into the United States?

Dr. SHAW. We do not think so, sir. We have tried to determine the way it has been introduced but we have not been successful.

Mr. ALBERT. The reason I ask this question is that it might go to the question of Federal responsibility if it were brought in, as is apparently widely believed by Air Force bombers and was first seen near Air Force strips used by Air Force bombers that have been to Italy and the Middle East. Would you care to comment on that, Dr. Shaw?

Dr. SHAW. Certainly it must have come in from a foreign country and it has come by some means of conveyance of that type.

Mr. ALBERT. The probabilities are that the Federal Government brought it in in the performance of its military obligations; is that not a fair statement?

Dr. SHAW. It may have. I cannot say whether it is probable or not.

Mr. ALBERT. What other way could it have come in?

Dr. SHAW. Commercial transport.

Mr. ALBERT. That, it would seem to me, would be rather far-fetched because the number of commercial transports that go to New Mexico out of the Middle East or Italy is probably very small. But the number of bombers that go between those points is, as I understand it, quite large.

Is that true? I think we ought to have that question answered more definitely as to whether there is any real reason to believe that the Federal Government was responsible for bringing in the pests.

That is the opinion of a number of people from whom I have heard.

Dr. SHAW. I have no way of determining that answer.

One of the problems with which we are concerned at the present time—and in our budget that we have before Congress we are asking for action to protect us better—is on the matter of passengers going through customs where they can bring in a little plant or some meat or something of that sort that can carry livestock or plant diseases into this country.

With the recent procedures in this country where customs only spot checks baggage, we feel that we are in considerable danger of bringing in pests with these spot checks. The spot checks made at the New York port of entry would indicate that we are not picking up more than 16 percent of the potentially dangerous material. So we proposed to the Congress that they increase our appropriations by $800,000 so that we can make it available to customs to go back to the full baggage inspection and thereby give us that added protection.

Now, this aphid could have come in on plants in passengers' baggage. I do not know whether it did or didn't.

Mr. ALBERT. Now, the next question.

The area of Federal responsibility in fields of this kind, if I understand you, is, first of all, that it is the general policy—and has been for years—of the Department of Agriculture and the Congress not to provide control and elimination assistance to individual farmers or to a crop in an area?

Dr. SHAW. Unless we see an opportunity to eradicate the pest from the United States.

Mr. ALBERT. Your fields of responsibility, as I understood you, were threefold; first, research?

Dr. SHAW. Yes, sir.

Mr. ALBERT. Second, control to an area, prevention of spread?

Dr. SHAW. Yes.

Mr. ALBERT. And third, possible elimination?

Dr. SHAW. Yes.

Mr. ALBERT. You have testified that the elimination of this with known chemicals, as I understand it, would be an impossible job on the part of the Federal Government?

Dr. SHAW. From the standpoint of the information that we have, we think it would be impossible to prevent the spread of this.

Mr. ALBERT. Either to eliminate it or to prevent it from being spread?

Dr. SHAW. Yes, sir.

Mr. ALBERT. So your conclusion is that the Federal Government should limit its responsibility to an aggressive research program?

Dr. SHAW. Yes, sir.

Mr. ALBERT. And in that connection, do you have all the legislative authority you need for that purpose?

Dr. SHAW. Yes, sir.

Mr. BELCHER. Do you have all the funds?

Dr. SHAW. I think we have sufficient funds, too.

Mr. ALBERT. That is the next question.

Do you have all the money you need or will you have if what you ask for is granted by the Congress this year?

Dr. SHAW. Yes, sir.

We feel that we will have adequate funds and I have an ace in the hole on that.

The Congress has provided me with authority to transfer funds between appropriations, if necessary.

Mr. ALBERT. I have taken this up with Dr. Hawkins in my own State and he was fearful, or I understood that he was fearful that, by transferring funds, we might run into the business of injuring some other project which, though not immediately as important, might be, in the long run, probably just as important, and we do not want that to happen.

If we have a special problem, we ought to have special funds. That is my contention.

Dr. SHAW. I am basing my views related to the fact that we have an increase proposed in our budget of $19.5 million for research. If that is not granted, we will not have enough money.

Mr. ALBERT. Could you effectively use any more money than that?

Dr. SHAW. I think we will be able to make such adjustments as will be necessary within the proposal that we have asked of Congress.

Mr. ALBERT. In other words, you have asked for all the money you need or could effectively use?

Dr. SHAW. We think so, sir.

Mr. ALBERT. What, then, do you think we are going to be able to say to these farmers who are losing their entire crops or a good portion of their entire crops?

Dr. SHAW. I know that they are under extreme difficulties. I think that most of them can maintain their crops with this spray or dust program with insecticides. It is going to add to their expense, no question about that, but many other farmers on other crops are having to bear the same kind of expense.

Mr. ALBERT. I realize that the boll weevil and the green bug have been considered generally, at least in the later stages, the problem of the individual farmer but usually, when those things start, does not the Federal Government try to go in and measure the situation and see whether it can eliminate the pest or check its spread, and have you already done that in this case and have concluded that you cannot do either?

Dr. SHAW. With every new insect that we have, our first approach is: Can we stop it where it is and eradicate it? If we can, we move right in.

We were in difficulty on this particular one because it was sometime after it got established in New Mexico before we discovered that it was a different type of aphid than the ones that we have had widespread in the country.

Mr. ALBERT. Could you justify under our present policy or under any past policy a program of helping farmers buy chemicals or furnishing them any material of direct aid to eliminate or control the pest?

Dr. SHAW. I do not think we could, sir, unless we would be willing at the same time to provide the insecticides for the control of the boll weevil, the insecticides for the control of insects on all the fruit and vegetable crops and all other crops that we use.

If we went into that, that would be billions of dollars.

Mr. ALBERT. Dr. Shaw, I have from my own State, from State government agencies, estimates of damage much greater than that which you have given in your own statement. In other words, the damage in Oklahoma is estimated, according to checks that have been made within the last 3 days, to be greater, if I understood your statement right, than what you have said it would be for the entire United States.

Dr. SHAW. The figure that I gave, Mr. Chairman, I said the Southwestern States. I meant Arizona, New Mexico and California.

Mr. ALBERT. I am sorry.

I think we should have for the record your estimate, if you have it, of the nationwide damage to the alfalfa crop in terms of percentages and in terms of dollars to the farmers.

Could you give us that?

Dr. SHAW. I could not give you that figure, but the acreage in Arizona and New Mexico and California would probably run about 1,400,000 and you have almost that many acres in, say, Kansas.

Mr. ALBERT. Six hundred forty-six thousand acres in Oklahoma. The conservative estimate of losses to farmers would be 18 to 20 million dollars. That is what Mr. Shawnee Brown, Director of the Extension Service, tells me. He says that in some areas the damage has run as high as 75 percent, and that he thinks it would be conservative to say that it has already averaged 35 percent across the Alfalfa Belt in Oklahoma.

Dr. SHAW. Yes.

Mr. ALBERT. This is information that he has gathered and sent in to me. From telephone calls that I have had from Kansas, Mr. Hope, I would think that the damage was great or maybe a little greater, percentagewise.

Mr. HILL. I have a question.

Mr. ALBERT. Proceed.

Mr. HILL. There is a question that bothers me considerably.

Have you had researchers in foreign countries trying to find out if they have a comparable aphid so that you could get some idea what country might have spread this terrible thing?

Dr. SHAW. Where we have our people is where the aphid does exist, and they are studying predators in connection with the aphid, the natural insect enemies on the aphid that are effective in those countries, holding it in control, and we are bringing those predators back here to see if they are safe to release, and then releasing those here.

It could have come from any of a number of countries in the Near East where it is established.

Mr. HILL. Do they not have alfalfa practically in every area now at the present time, the whole world almost, some kind of alfalfa?

Dr. SHAW. I would expect it is in most of the world, yes.

Mr. HILL. Therefore, you should be able to find out pretty much the type of aphid they have in those various countries and almost determine where this one came from?

Could you do that?

Dr. SHAW. This one is more widespread than one country.

Dr. Knipling, you said it was in the whole Near East?

Dr. KNIPLING. Yes. I would like to elaborate a little on that.

Our specialists in this field say that there are about 4 or 5 aphids so similar in appearance that it is extremely difficult to distinguish between

them and they are studying those characters and they are learning more about it but this aphid, or variety, occurs in India, Europe, the Near East, in possibly other areas of the world, but the specimens from Iran and Iraq, they tell me, are most like the ones we have here, the spotted alfalfa aphid.

Mr. HOPE. Will you yield?

Mr. HILL. Yes.

Mr. HOPE. This pest originated in the Southwest and it has been sort of moving through prevailing winds, I take it, and has spread in a northeasterly direction.

Is there any possibility it may have come from Mexico in the first place?

Dr. KNIPLING. There is that possibility. We have not explored to see whether it occurs in Mexico.

Mr. HOPE. You do not know whether it does or not?

Dr. KNIPLING. No.

Mr. HOPE. Let me ask just one other question.

A few years ago we had a very bad infestation of green bugs in the Southwest that were particularly destructive to wheat and it looked like they were going to take everything.

Suddenly the next year something happened and green bugs disappeared and I do not think we have had a serious infestation since that time.

Is this the type of aphid that might run through that sort of history for 2 or 3 years and then disappear?

Dr. KNIPLING. The green bug is a native aphid and it has probably all of its natural enemies that you would expect it to have, and an outbreak such as we had was probably an unusual circumstance where weather was favorable to the aphid and unfavorable to the natural enemies that normally keep it in check to a great extent.

Now, this aphid, having been introduced from some foreign area and not having brought with it the natural enemies that tend to keep it in check in those areas, just spreads all out of proportion. The native natural enemies that we have will do some good but they perhaps are not adapted in their life cycle to coincide with the increase in reproductive potential of this new aphid. That is one reason why we in the State of California are scouring the world insofar as we are able to try to bring in as many of these natural enemies as possible and try to get them established here.

We are rearing the parasites in New Jersey, one of our receiving stations, and California is rearing the parasites and predators, and as quickly as we can, we are introducing some of these into affected States.

I think we have now released parasites in eight different States, but of course, only a few are being released and it takes time for those to increase and we are not sure whether all of these parasites will become established and do well in these different areas.

Mr. HOPE. Well, the work that is being done by the use of chemical sprays, of course, as I understood Dr. Shaw, also destroys the natural enemy, so you pretty nearly have to carry on this work with predators in some areas where farmers are not using the spray?

Dr. SHAW. We have to get that kind of agreement from the people not to spray so as to give these enemies a chance to spread.

Mr. HOPE. You are doing that?

Dr. SHAW. Yes.

Mr. ALBERT. Any further questions?

Mr. LOVRE. Mr. Chairman?

Mr. ALBERT. Yes.

Mr. LOVRE. I am thinking in terms of Government responsibility, Mr. Shaw. Are there any like infestations that we have had in this country that we have had in the last few years wherein the government has come in and assisted the farmer in an eradication program?

Dr. SHAW. No, in those cases where we think we have a chance for eradication, we do go in with either eradication, or if we can control it to the area where it is but with any that we think it is going to spread and that we know no way of controlling it, then we do not go in.

Mr. LOVRE. Then you have no like cases that you could call attention to?

Dr. SHAW. No.

Mr. HOPE. Originally you started out to eliminate the corn borer, did you not, on the theory that by setting up belts where you would not grow any corn, you would stop the progress. That was finally given up and the corn borer is now prevalent over practically the entire corn belt?

Dr. SHAW. We think we slowed down the spread of that very materially for a number of years and, in slowing down the spread, it was of benefit to considerable parts of the country but at the time when it is no longer possible to control the spread, then we feel the farmers have to assume responsibility.

Mr. HOPE. You did finally give up on the corn borer?

Dr. SHAW. Yes.

Mr. HOPE. What about the Japanese beetle? Did you start out with an eradication campaign as far as the Japanese beetle is concered?

Dr. SHAW. We are still attempting to prevent the spread of the Japanese beetle to areas that do not have it.

Mr. HOPE. It is spreading?

Dr. SHAW. It is spreading in spite of our effort.

Mr. HOPE. But in the case of the Japanese beetle, your efforts have not been in the direction of assisting individual farmers?

Dr. SHAW. We have stayed on the periphery of it and have tried to hold it back.

Mr. ALBERT. But that will not work in this case?

Dr. SHAW. We do not think so.

Mr. HARRISON. Mr. Chairman?

Mr. ALBERT. Mr. Harrison?

Mr. HARRISON. Do you have any cautions to the different areas where the aphid has not yet shown itself to the farmer at this particular time? Would you advise against sowing alfalfa, or are there any precautions that the farmer can take to make sure that the aphid does not get into this particular area?

Dr. SHAW. I do not think there are any precautions that he can take to prevent its getting in there. We hope, through our Extension Service, to alert all the farmers to these chemical controls that are available once he has it. Our big problem in this case is that the farmers have not been used to applying insecticides to alfalfa.

Now, we have a situation where we are going to have to apply them in order to hold the crop.

Mr. HARRISON. As a precautionary measure before the aphid shows itself, would it be well for him to spray to prevent its showing?

Dr. SHAW. I do not think he can afford to do it until he actually has the problem.

Mr. HARRISON. Would you advise against sowing alfalfa until this thing has been put under control somewhat?

Dr. SHAW. No, sir, because I believe that even taking the expense that is involved, the falfalfa crop is worth enough to justify going ahead and using it.

Mr. HARRISON. No further questions.

Mr. ALBERT. Thank you very much, Dr. Shaw. We certainly appreciate your appearance here and your testimony.

Dr. SHAW. Thank you, gentlemen.

Mr. ALBERT. The other problem which I mentioned in my opening statement was that we have had calls from cattle feeders, particularly dairy people who feed alfalfa hay, about the possible short crop in the southwest.

We have the precedent of the Government assisting farmers in a hay program, particularly with reference to freight which was used during the widespread drought.

To elaborate on that phase of the problem and to tell us what they have done and what they might anticipate and how we might get ready, we have asked Mr. Kenneth Scott, who is the Director of Agricultural Credit with the Department of Agriculture, to speak to us about it.

Mr. Scott, we would like to hear from you. Do you have a prepared statement?

STATEMENT OF KENNETH SCOTT, DIRECTOR, AGRICULTURAL CREDIT, DEPARTMENT OF AGRICULTURE

Mr. SCOTT. No; I do not, Mr. Chairman.

Mr. ALBERT. I know you were called on rather short notice.

Mr. SCOTT. I would be very glad to talk to you about our experience with this program.

Mr. ALBERT. Do you feel that you will need any legislation or funds for anything else to put into operation a program similar to the one that was used in the drought so far as alfalfa hay is concerned, and to help you get hay from the uninfested areas into other areas if this thing gets as bad as the evidence indicates it might?

Mr. SCOTT. Mr. Chairman, as to whether we have enough funds, that would depend, of course, on just how big a problem we would encounter here and just how widespread a program of this kind might be.

I will be very glad to furnish you the exact figure on the amount of funds that we have available, but it is not a large fund. It is a few million dollars.

(The data requested above is as follows:)

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., April 26, 1956.

MR. FRANK M. LEMAY,
Commodity Subcommittee, House Committee on Agriculture,
House of Representatives.

DEAR MR. LEMAY: During the testimony before the Special Commodity Subcommittee of the House Committee on Agriculture, I promised to submit a statement showing the amount of funds available for use in a hay program. The enclosed statement indicates the amount we have expended during each of the last 3 years and shows a balance of $11,384,703.

As I stated during my testimony, we are now using title III of Public Law 480, 83d Congress, for the feed grain program, thus the subsidy on feed grain is carried on the books of the Commodity Credit Corporation and enters into its report on losses sustained.

The only charges we now make to the $50 million fund referred to in the attachment are for administrative and auditing costs. This greatly conserves the fund. As you will notice from the attached report the change-over on the grain program shows up in part on the 1954 program and completely in the 1955 program.

Sincerely yours,

K. L. SCOTT,
Director, Agricultural Credit Services.

April 25, 1956

Amount of funds used in the emergency feed programs to date

1953 programs (fiscal year 1954):	
Hay	$3, 291, 680
Feed grain	28, 000, 000
	31, 291, 680
1954 programs (fiscal year 1955):	
Hay	4, 594, 121
Feed grain	2, 064, 688
	6, 658, 809
1955 programs (1956 current fiscal year):	
Allotments made:	
Hay	100, 000
Feed grain	564, 808
	664, 808
Grand total amount used	38, 615, 297
Hay	7, 985, 801
Feed grain	30, 629, 496
Out of the original $50,000,000 amount still available for use and unallotted	11, 384, 703

Mr. SCOTT. The problem that we run into on this hay program and the grain program, too, as you referred to, Mr. Chairman, it is most commonly the result of inquiries or requests from dairymen who feed, or at least buy, grain feeds throughout the year, and often get into alfalfa purchases.

Oftentimes, this is from investigations that we make and submissions from these counties, it is clearly indicated to be an economic problem. We have been carrying on this program under, as you gentlemen know, the disaster authority that we have. We use title III of Public Law 480 for the feed grain program, and that works out very nicely.

Mr. ALBERT. Would that work in this case?

Mr. SCOTT. That particular section will not because it is authority that the Congress has given us to use surplus commodities owned by the Commodity Credit Corporation.

Of course, that works fine with the feed grains and we have an arrangement worked out whereby the feed is available in declared areas through all feed dealers.

So the eligible farmer or rancher merely goes to his customary source of feed grains and get sit. The ultimate help that the Government gives is in redeeming the certificates that the dealers require, redeeming them only in terms of Commodity Credit Corporation surplus grains. So it involves practically no dollar costs aside from some administrative cost.

Now, on this hay program, the experience has not been generally satisfactory. We have followed the plan of working closely with the States and have handled it sort of as a joint undertaking. Of course, you have to have a distribution arrangement of some kind, a question of how you acquire the hay is another problem.

One or two of the States, two or three I think, in the first years of this program set up a rather elaborate arrangement whereby they did a great deal of the locating and handling of the arrangements for purchasing and getting hay in and distributing it and all of that that was involved. It was such a problem that they have told me since that they just felt they could not get into that sort of deal again. The common way that the hay has been brought in has been by trucker, and that has a good many advantages in that they go out and get the hay and haul it right to the farmer or rancher, but it is just next to impossible to exercise any control over the cost of the hay or the transportation that is involved, and you have, in all due respect to the statements that these truckers furnish you, almost have to accept their statement that they got the hay at a certain place and they transported it a certain distance.

I am confident the general impression of the people in the States, the commissioners of agriculture, and our own folks, is that that plan has not been very satisfactory. There is a lack of control on the price that is very obvious and the general complaint is, and I think with considerable justification, that when the Government goes in and offers up to $10 a ton, as we have on the transportation costs, that that gets worked over into the price of the feed and the farmer pays just about as much for the feed as he was paying before the program was instituted.

Of course, we do have to recognize that, as hay is picked up in an area that is in somewhat short supply, and you go to a greater distance, there is an increased cost but it just has not been a program that has seemed to satisfy anyone to any appreciable degree, very much in contrast to the general feeling, I believe, that the feed grain program has worked out with considerable success.

So I just wanted to relate the experience that we have had with those two programs.

We, again operating under authorities of disaster designations, have felt that in the first place, getting back to the hay program again, that we should make that available only when it was quite an acute situation, not one that we might properly think of as being just an economic problem, as clear as that might be; that some of the farm

people and dairymen particularly were confronted with some pretty narrow margins.

But it has not been the thought that we should go in and try to help those expense accounts in that manner excepting where it was really approaching what we would all think of as a widespread disastrous condition.

Mr. ALBERT. Pardon me for interrputing you, but does the President have, or does the Department have, under disaster statutes the authority to invoke disaster provisions and put in some sort of relief program should it be determined that it should be called for?

Mr. SCOTT. Yes, sir; we do have.

Mr. ALBERT. That authority does exist in law?

Mr. SCOTT. Yes, sir.

Mr. HOPE. If I understand you correctly, you would consider something of this kind, an attack by an insect which destroyed large quantities of hay, of the same character as a drouth or other disaster if it went to the extent that it created a shortage and required the bringing in of hay from another area.

Mr. SCOTT. Yes, Mr. Hope, I think we should. If we found an area where I think it ought to be a good part of a State, not just some isolated county or two because hay in that event would be relatively available.

If we had a whole State, for example, that was just practically out of hay, then I think that would certainly indicate that we ought to get right in there and work closely with the State people and see what we could do to be of some help.

Mr. ALBERT. The fact that it was a bug or an insect rather than drouth that caused the disaster would not be a determining factor?

Mr. SCOTT. I do not think so. I think that it ought to be the degree of the seriousness of the problem that is rather widespread and indicated disaster proportions there, and not just an economic problem.

Mr. HOPE. It is the size and extent of the disaster rather than the character?

Mr. SCOTT. That is my feeling, Mr. Hope; yes, sir.

Mr. ALBERT. Any more questions?

Mr. Hagen?

Mr. HAGEN. I think you indicated that this hay program is under some different program than the feed grain program.

Mr. SCOTT. So far as the law is concerned.

Mr. HAGEN. What is the law?

Mr. SCOTT. I will have to depend on my memory there, but I believe it is Public Law 38 and I think there is some further authority in Public Law 115.

I am sorry I do not have those.

Mr. HAGEN. Does either of those require some public disaster announcement by the President or Government agency?

Mr. SCOTT. Yes, sir.

Mr. HAGEN. To get back to the feed problem, I understand that poultry are not considered livestock, which is one example.

Mr. SCOTT. That is right.

Mr. HAGEN. I am a little bit indefinite about this next point.

One farmer might have cows of a certain type, not a breeder stock but fattening them to sell, and another farmer has breeder stock. As I understand, one of those farmers might get this help and the other would not? Do you follow me?

Mr. SCOTT. Yes.

Mr. HAGEN. I would like to get in the record what that distinction is.

Mr. SCOTT. Well, the policies that we have been following up to now, and are still in effect, have been, in determining eligibility for this feed assistance, both in the hay and the grain programs, to limit the assistance to maintaining basic foundation herds of cattle, sheep, and goats where they are in the southwest goat country.

The reason we have felt that that was particularly important, first, part of this authority, as I understand it, was to attempt to keep those breeding herds out there on the land and to avoid an indicated excessive marketing and the liquidation of herds.

In weighing the question of eligibility between beef cattle, herd cattle, cattle that are kept for breeding, which would include the heifers retained for replacement and the same with the sheep and the goats, as distinguished from the hog producer and the poultryman, it has been that the great difference in length of time, as well as the investment that is involved in establishing a herd of cattle. The hog men have a much shorter cycle of production, of course, and the investment is lower.

The poultry has a still more rapid cycle of production there. That has been the main reason that we have felt we ought to limit the eligibility to these breeding herds.

Now, in the case of cattle or other livestock, sheep even, that are acquired and are destined for market, being fattened out for market, that is a transaction, of course, that occurs in the light of all the information that is available, the availability of feed, the outlook for price at rather a short time down the road when they expect to have their livestock in marketable condition, certainly being very much in favor of the purchase of feeder stock as contrasted with the breeder herd who makes a long-term investment, and he has to work it out.

Those are the general factors that we have considered and felt justified confining the help to the foundation herds of cattle, sheep and goats.

Mr. HAGEN. I am not a cattleman and I do not know the descriptive word, but say farmer X has 40 cows and of that 40 he is going to use 20 of them to reproduce more cows, but the 20 he is going to ship to market. He cannot get his feed for those 20, can he? He cannot do that, even though they came from his own cattle?

Mr. SCOTT. Not under the eligibility standards that we have. We do attempt to make the lending authority of the Farmers Home Administration as helpful as possible, and while it is a different type of help, certainly, than granting some relief on the price of feed, it is a very useful help.

Mr. ALBERT. We are glad to have this but it is really extraneous, Mr. Hagen.

Mr. HAGEN. You were talking about this hay program and feed program. I wanted to get it on the record.

Mr. ALBERT. This subcommittee does not have jurisdiction over that problem.

Mr. HAGEN. I realize that; but these programs have been mentioned.

Mr. ALBERT. I would like to close it up as soon as possible.

Are there any other questions of Mr. Scott? If not, we certainly thank you for your appearance, Mr. Scott.

Mr. SCOTT. Thank you, Mr. Chairman.

Mr. ALBERT. At my request, I have statements that I would like to insert in the record. One is information furnished me by Dr. Louis E. Hawkins, director of the Oklahoma Agricultural Experiment Station at Stillwater, Okla.

(The information referred to follows:)

NOTES ON THE SPOTTED ALFALFA APHID IN OKLAHOMA

Common name.—Spotted alfalfa aphid, previously called yellow clover aphid.

Scientific name.—*Therioaphis maculata* (Buckton). Described from alfalfa in India as *Chaitophorus maculatus* Buckton.

History.—First described from alfalfa in India in 1899 by Buckton. Next reported by Theobald from berseem in Egypt (1915). In 1918 reported from India on alfalfa and berseem by Das. Theobald reported it a pest in India from March to May. Later reported from southern and eastern Mediterranean countries as far east as central Asia and south into India and the Shantung province of China. *Therioaphis* (Myzocallis) *trifolii* (Monell), now called the yellow clover aphid, which has been recognized as a minor pest of clover since 1906. The life history of this pest was worked out by Webster, 1909, Davis, 1910 and 1914.

Introduction to the United States.—Thought to have been introduced into New Mexico by a long range military plane, probably late in 1953. It was recognized as a pest of alfalfa in New Mexico by February of 1954. It was soon found in California and by May was present in Arizona. In June it was causing economic damage in California and was recognized in Payne County, Okla., early in July. Before winter it was found in Mexico, Nevada, and many parts of southern California. During 1955 it spread with alarming rapidity and caused serious damage in all southwestern States, including Nebraska, Kansas, Colorado, and Utah.

Damage.—Damage to the plant is caused by the removal of plant fluids and by the injection of toxic substances. Histological sections show that many cells around the punctured cell are killed, apparently by a powerful toxin. Usually the first evidence of damaging populations is reduced growth. This is followed by the appearance of fine droplets of glistening honeydew on the leaves. Cast skins and honeydew are quite obvious on the ground beneath the plant. Soon the plants are covered by sticky honeydew, which makes harvesting difficult without frequently washing harvesting equipment. Shoes are quickly covered by aphid secretions when walking through infested fields. Heavily infested plants soon lose their normal green color and turn yellowish. The lower leaves are killed and drop. Soon the plant begins to droop and takes on a wilted appearance. Continued infestations with heavy populations almost invariably result in death to the plants. Less severe infestations greatly retard growth and result in hay of a much lower quality which has few leaves and is often darkened by fungi growing in the honeydew. Stand thinning may be serious. Dr. H. F. Murphy estimated that 40 percent of all plants in Oklahoma were killed in 1955. In 1956 the figure has been greatly increased.

These symptoms are aggravated by drought or freeze damage and when growth is retarded severe injury may result from lower populations.

Seedling alfalfa is highly susceptible to aphid attack and small plants may be killed by a single aphid. Protection of these fields is difficult.

Biology.—The spotted alfalfa aphid has not been controlled by weather conditions in Oklahoma. Below-zero temperatures slowed the aphids only temporarily and summer temperatures above 100° did not significantly reduce the aphid. Limited data indicate that heavy dashing rains may reduce populations significantly.

Life history.—This aphid has the usual aphid life cycle in that both winged and wingless females are present the year round. These give birth to living young. During late fall and winter small numbers of males and oviparous females appear, but eggs have not been found to date. The time required for development varies with weather conditions. Under optimum conditions 7 to 8 days are required, but 3 to 4 weeks may be necessary under less favorable conditions. Young may be produced shortly after the last molt, in other cases 24 to 48 hours may elapse. From 2 to 4 young are produced daily when conditions are favorable, and maximum total young exceed 100. Reproduction proceeds rapidly at any time of the year when weather conditions are favorable. Young in all stages may be found any week of the year in Oklahoma.

Control.—Chemical control suggestions are based on the 1955 season's work and the work to date in 1956. All readily available materials which have shown promise in aphid control were tested in replicated one-fourth-acre plots. More successful materials were tested at several concentrations.

On the basis of cost, availability, and freedom from residues, Malathion and Parathion have been recommended. Malathion at 8 to 12 ounces per acre is suggested for smaller fields where ground equipment must be used or when the hay should be harvested soon. Parathion at 4 to 6 ounces is somewhat more effective but cannot be recommended for use in ground equipment because of its extreme toxicity to warm-blooded animals. In addition, 15 days must elapse before the field can be pastured or cut for hay.

Several newly developed chemicals show promise: 8305, a thinophosphate of much lower toxicity to mammals, was equal to or better than Parathion as a control for aphids. This material will be extensively tested this season.

Biological control with predators is only partially effective. To date ladybird beetles have appeared in large numbers and have reduced aphid populations only after the alfalfa crop has been severely reduced. Predacious bugs, lacewing flies, and syrphid flies have some effect but seldom enough to make chemical control unnecessary.

Cooperative work with the USDA, Entomology Research Branch, and the department of entomology of the University of California has made it possible to introduce three kinds of parasites which feed on the spotted alfalfa aphid in its native home. One kind, *Aphelinus*, has been recovered several times and possibly will be helpful. These recoveries occurred in spite of very adverse weather when the parasites were released.

Resistant varieties of alfalfa.—At present one variety (Lahontan) shows considerable resistance to spotted alfalfa aphid attack. While it is not agronomically well adapted to this region, it may be a good source of desirable germ plasm. In addition, some of the introductions from Turkey made by Dr. Harlan have been quite resistant to this pest in the nursery and merit further testing.

Current research needs—Biology.—The general biology of this pest has been worked out in several States but detailed information is needed to make it posible to predict population increases, comparative rates of development of the aphid and its predators or parasites, the effect of adverse weather, the point in population increase when control measures may be used most successfully, the dispersal patterns to be used as a guide to expected reinfestation and other host plants.

Agronomic practices.—Grazing, close cutting, burning, irrigation, harrowing, and selective cutting have been suggested as possible means of reducing the severity of aphid attack. Little positive information is available and much is needed.

Biological control.—The damage done by most newly introduced pests is usually most severe during the first 5 years. This gradually decreases as parasites and predators become established. Research is needed to insure and speed up the phenomenon. Parasite and predator rearing has greatly increased the scope of biological control by making it possible to have large populations early in the season which can control the aphid before it seriously damages the crop. In the native home of the aphid severe outbreaks are uncommon and alfalfa may be successfully grown, apparently because of parasites and predators. Further introductions from these areas are needed. Insect diseases have shown some promise and should be extensively studied.

Chemical control.—The aphid is relatively easily killed but reinfestation rapidly occurs. Chemicals which will control over an extended period yet not cause residues on the hay are needed. Methods of application such as seed treatment, side dressing with fertilizers, foliage absorption, and as pellets need additional research. Methods to reduce the personnel hazard during large-scale treatment must always be considered.

Resistant varieties.—The development of resistant varieties offers one of the most encouraging avenues of control. Lahontan, a new variety, adapted to central California and Nevada, is quite resistant, as are some of the plant introductions from the native home of the pest. Extensive evaluation of promising varieties in the seedling and mature stage when exposed to heavy aphid populations is needed.

Mr. ALBERT. The other is a letter containing information from Mr. Shawnee Brown, director of the cooperative extension work in agriculture and home economics of Oklahoma, Stillwater.

Without objection, this also will be inserted in the record.

(The information referred to follows:)

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND
HOME ECONOMICS,
Stillwater, Okla., April 21, 1956.

HON. CARL ALBERT,
Oklahoma State Congressman, House Chamber,
Washington, D. C.

DEAR CONGRESSMAN ALBERT: This letter is in response to your telegram of April 20 regarding damage done by the spotted alfalfa aphid.

Attached you will find a publication prepared by our service entitled "The Spotted Alfalfa Aphid," which gives characteristics of this pest and recommended methods of control. Our entire State is affected by this pest with the possible exception of Harper, Beaver, Texas, and Cimarron Counties which have low acreages of alfalfa. The extent of damage varies somewhat in different areas of the State. A conservative estimate of damage indicates that one-third of the acreage has been destroyed and plowed up or will be plowed up as soon as moisture is available. In addition to the acreage destroyed beyond recovery, there is an enormous loss from the acreage remaining. Based on last year and observations so far this year, we believe a conservative estimate of yield reduction from the spotted alfalfa aphid would be about 35 percent. In some areas it runs 75 percent damage, but we feel that the statewide damage at present would average about 35 percent; however, the destruction is continuing and may reach a much higher figure.

This reduction is taking place in spite of extensive efforts to control the pest by using the best known methods of control. The weather has been too cool and windy until quite recently in most of the State to permit insecticides to kill the aphids. Where the pest has been killed by spraying, in many cases fields are reinfested by the insect flying in before the alfalfa has a chance to start growing. Many fields have been sprayed as many as 2 or 3 times and farmers are continuing to do everything they can to control the aphid; but as indicated above, control is difficult.

This insect is a real threat to Oklahoma's alfalfa crop. According to estimates we had about 646,000 acres. Losses of stands plus loss of yield on alfalfa remaining would conservatively run 18 to 20 million dollars. We estimate it would cost about $4½ million to reseed the acres lost, with approximately $8½ million loss in hay crop on these acres and approximately $6 million loss in damage to the acreage remaining.

It is difficult to predict the impact this will have on the alfalfa grower and the livestock and dairymen. Unless more satisfactory methods of control are brought into use, land values of alfalfa farms will likely decrease materially and farmers will need to make considerable adjustments in their operations and equipment which will also be quite expensive. If weather conditions are favorable, much roughage can be grown to partially replace alfalfa needs of cattlemen and dairymen; however, if the legume hays or additional concentrate needed to supplement other roughages are used, we must expect a considerable increase in price cost.

With reference to the need for a hay program, we believe it would be wise to anticipate such a need, but that under very favorable weather conditions the need may not materialize. Many growers can grow some other roughage in the place of alfalfa for their own use if we have the moisture; however, they would not have a surplus of alfalfa for sale to those who need to buy hay and who have no way of producing their own roughage.

We shall be glad to provide additional information if desired.

With kindest regards, I am

Yours very truly,

SHAWNEE BROWN, *Director.*

THE SPOTTED ALFALFA APHID

By C. F. Stiles, extension entomologist

he spotted alfalfa aphid, formerly called the yellow clover aphid, has now spread over the entire State of Oklahoma. It was a serious pest of alfalfa through the central portion of the State, from Texas to Kansas, during 1955. By March 15, 1956, this pest had again appeared in large numbers throughout this area, and was also being found in damaging numbers in other sections of the State. As the season advances we may have serious damage in all sections of the State.

HOW TO RECOGNIZE THE APHID

The spotted alfalfa aphid is small, light yellow, with six rows of very small black spots on its back. When infestations are light, the aphids are usually found on the underside of the leaves, however, when infestation is heavy, or during the winter months, the entire plant may be covered, including the stems. Many of them will jump when the plants are disturbed, and you may overlook the one that jumped in your infestation counts. They are both wingless and winged.

ORIGIN OF THIS INSECT

This pest appears to have lived on alfalfa for a long time in Asia, India, around the Mediterranean in Europe and Africa. It was first found in the United States in early 1954 in central New Mexico. The first specimens were picked up in Oklahoma near Stillwater during July 1954. The entire State of Oklahoma is now infested, as well as the southern half of the United States west of the Mississippi River.

OTHER HOST PLANTS

This aphid also feeds on burr clover and button clover in this State. So far as is known, it does not live on red clover, Ladino clover, or sweetclover.

HOW THIS APHID REPRODUCES

The female spotted alfalfa aphid gives birth to living young at the rate of 5 or 6 per day, depending upon the temperature. The higher the temperature, the more rapid the birthrate—up to probably 90 or 95 degrees Fahrenheit. The aphids reach maturity in about 6 days, and in turn begin to give birth to living young. So far as is know, no males occur in Oklahoma. The adult females overwinter in the State. Reproduction may continue throughout the winter when the weather is mild.

HOW IT DAMAGES ALFALFA

These aphids damage hay crops by sucking out the sap, killing the lower leaves and damaging the other leaves. When numerous, they cover the plant with honeydew in which a black fungus grows. Stands throughout the State are thinned out so that weeds take over, and the crop has to be plowed up sooner than ordinarily. Young alfalfa may be killed out completely by this insect in a few weeks.

TIME OF MOST SERIOUS DAMAGE

Alfalfa is serious damaged in the late winter months and also during the hot summer months. Hard rains reduce the numbers, and injury is not severe following a period of wet weather. Areas currently most heavily infested are along the Washita and North Canadian River bottoms. Here, many fields have had to be plowed up due to aphid damage.

NATURAL CONTROL

Lady beetles have been found in enormous numbers in some alfalfa fields as early as April 1. However, the hay may be seriously damaged before the lady beetle increases to sufficient numbers to bring the aphids under control. To date, no parasitic wasps of the spotted alfalfa aphid have been found in Oklahoma; however, the experiment station has introduced three kinds which may help. Considerable work is being done on varities resistant to the spotted alfalfa aphid. A far-western variety known as Lahontan is known to have some resistance; however, this variety is not suitable for Oklahoma conditions. Buffalo alfalfa has shown some resistance.

CHEMICAL CONTROL

The spotted alfalfa aphid is quite easy to kill, but the fields are often repopulated soon after spraying. Due to the fact that these insects multiply so rapidly and may fly in great numbers, a clean field can be repopulated by the winged forms flying in from nearby untreated fields or by the few individuals that survive poisoning.

INSECTICIDE RECOMMENDATIONS

Both parathion at the rate of 4 to 6 ounces per acre and malathion at from 8 to 12 ounces per acre give good control. Sprays give better control than dusts,

and they can be put on at times when it is too windy to apply dust. The higher dosages should be used on larger alfalfa in order to get better coverage. For airplane application, use approximately 2 gallons of water per acre. For ground spraying, use around 5 to 10 gallons of water per acre. Apply when the wind is calm and the termperature is 50° or above.

HARMFUL RESIDUES

Harmful residues should be avoided by making applications of parathion 15 days before date of cutting and malathion 7 days before date of cutting. Other insecticides such as DDT and BHC are not recommended, since they may leave too much harmful residue.

WHEN SHOULD THE FIELDS BE TREATED?

Young seedlings should be treated when you find a few aphids per plant. It is rather difficult to say just when, since the fields could be reinfested in a week after you have applied poison. On older plants, treatment should be made at the first indication of injury and before the plants are covered with honey dew. Examine your fields every 2 or 3 days so that the infestation can be checked when it reaches damaging numbers.

Mr. ALBERT. These contain evidence showing the nature and extent of the damage in Oklahoma, and to some extent in other States, and I think they are illustrative of the problem.

The Chair notes the presence of two of our colleagues who are interested in this problem. We may have a later hearing, depending on how many of our colleagues want to testify.

Since we have a little time, I would like to ask whether our colleague from New Mexico, who has waited patiently, might have something to say on this subject.

Mr. FERNANDEZ. I have a short statement.

Mr. ALBERT. Without objection, the committee would be glad to hear from you.

STATEMENT OF HON. ANTONIO M. FERNANDEZ, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW MEXICO

Mr. FERNANDEZ. Mr. Chairman, I want to thank you for this opportunity to appear in support of your bill, which I think is excellent and should be enacted into law.

The spotted alfalfa aphid has already siphoned over $6 million from farmers since it was first discovered in my State in the fall of 1953, not 1954, and as is the case with such plant infestation, the spread is increasing year by year.

The need, especially for research in its control, is apparent, and the need for cooperative effort in research and control can be met adequately throughout the country only through the mechanisms available to the Department of Agriculture.

One enterprising farmer in my State, Henry Schlothauer, of Las Cruces, N. Mex., thinks that he has hit on what might be one way of heading off infestation, as reported in the Albuquerque Journal of last Friday. It may be of interest to you because it controverts the defeatist attitude expressed by the Department here this morning.

The article in the Journal reads as follows:

Mr. Schlothauer applies 1 gallon of diesel fuel—cost 12 cents—to an acre while irrigating on his farm near Las Cruces. He has not achieved 100-percent control, but he says his loss last summer was less than the average for farmers who sprayed or dusted at much greater expense. He's "greasing" his alfalfa again this growing season. Aphids won't attack the oily parts of the plant.

The fuel has killed no alfalfa, and it does not affect it as cattle feed.

Schlothauer gets six cuttings of alfalfa. He irrigates each cutting twice, applying diesel fuel with each watering. The first application must be made when the field is stubble or the alfalfa is not more than 2 or 3 inches high.

Application of the diesel fuel is simple.

First, Schlothauer figures how many acres are irrigated in an hour. Keeping that in mind, he determines the amount of oil necessary by filling a quart jar by drops from a 30-gallon barrel in 15 minutes. That is enough for a quarter of an acre. He also bears in mind that each field irrigates differently.

He places 5-gallon cans of fuel in front of each irrigation ditch turnout to drizzle into the water.

The oil spreads over the submerged field, and as the water settles, the oil coating forms on the stems. He applied the oil to the stubble on the first irrigation this season. Cool spring weather here so far has kept the aphids from appearing and diesel fuel application was not necessary with the second watering.

He started the oil application with the second crop last year and achieved about 80 percent aphid control.

Additional labor involved in the fuel application is almost negligible.

Surface of the water must be clear before the fuel is let into it.

Remember not to set the can of oil back of the culvert, a ditch box, or weeds, for all these will hold back the proper flow which forms a film on top of the water.

Then it describes in a little more detail what he does. Finally, it says:

His method has not been scientifically tested, but he got about 80 percent control last year. He has used the method only on his own land.

Of course, as pointed out in this article, the method has not been scientifically tested, and there is need for the discovery of the best methods to use in eradicating the disease from large alfalfa farms, where perhaps the method used by Mr. Schlothauer may not be quite so simple or effective.

I wish, therefore, to go on record as heartily in support of the enactment of H. R. 10502.

Mr. Albert and the other members of the Oklahoma delegation should be commended for introducing this bill at this time.

I think the testimony of the Department this morning, although intended to be adverse to the bill, emphasized the need for a vigorous, well-directed attack on this pest infestation.

I thank you.

Mr. ALBERT. We thank you, Mr. Fernandez, for your statement.

Mr. FERNANDEZ. May I say, Mr. Chairman, that I am not ready to plead guilty to the charge that this thing started in New Mexico. The fact that it was discovered there in 1953 or 1954 does not prove that it started there. I think it proves that New Mexico is where the people were diligent in identifying it.

Mr. ALBERT. We have Mr. Wickersham, who is the author of one of the bills.

STATEMENT OF HON. VICTOR WICKERSHAM, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. WICKERSHAM. Mr. Chairman, I am here in support of this bill, Mr. Edmondson's bill.

I might say that 3 or 4 weeks ago I called this to the attention of both the A. and M. College and the Federal officials in Stillwater, as well as the Secretary of Agriculture in Washington, D. C., and the chairman of this committee.

At that time I had a meeting with about 40 farmers in Verden, Okla., and probably 40 to 60 in number at the towns of Mountain View, Frederick, Lawton, Duncan, Altus, Diamond, Mangum,

Walters, Temple, Sayre, Buffalo, Gary, Cordell, Clinton, Anadarko, Hallett, Fallis, Chickasha, Foss, Burns Flat, Shattuck, and Ottawa.

In all of these cases, without exception, the aphids are moving in quite fast. At Strong City and at Cheyenne, their main complaint was the green bugs which are likewise infesting a large portion of this area.

As I understand it from the Department of Agriculture and through Dr. O. F. Smith of the University of Nevada, there are only 18 acres and they are in California and it is the only foundation field that is now aphid resistant. This seed would have to be planted by the 15th of September or the 15th of October, so we should do all we can to protect these fields.

I went out in the fields of Parker Woodhalls at Verden and saw side by side the number of fields that have been sprayed. It takes at least two sprays to control this aphid. If another farmer does not control his aphids, it makes it rather difficult on those who do.

All through the Elk Bottom, the Washita Valley, your district and Mr. Jarman's, it is getting worse.

I talked with Mr. King who has 16 planes running constantly in Chickasha, Okla. The Department indicated the people were not thoroughly familiar with how to spray for this.

For many months, in fact, the last 2 years, these people have been spraying for all kinds of pests, including aphids, in the last several months. They are getting quite bad.

One other point is that if the alfalfa ground is taken out of alfalfa as a result of these aphids, they have no basic history for either cotton or wheat or peanuts and they are in bad shape.

I think it is a national matter and I think it reaches to some extent a local disaster area and should be given consideration. This particular area has had 1, 2, 3, and 4, and sometimes 5 years of drought, although it is a very fertile area but the drought has affected them.

I just 4 days ago talked with Hugo Grauman out in Beltsville, who originally came from Oklahoma, and they are greatly disturbed and feel that the Government should come in and do its share. He feels that this is a good bill and we should give it attention.

I do feel that the hay program is going to be facing us again. There are many areas short of hay.

Back in the days a few years ago, this hay program was handled and handled successfully through the local PMA committees and it could be done again. The cost was rather small and saved the farmers $10 per ton of freight, and it ought to be put into effect again.

I hope the committee will give favorable consideration to this bill.

Mr. ALBERT. Thank you, Mr. Wickersham.

As I indicated previously, the committee might find it necessary to have a meeting again, although we do not have one scheduled.

In other words, we may have a meeting within a few days.

I would like, therefore, without objection, to adjourn the committee, subject to the call of the Chair.

(Whereupon, at 11:45 a. m., the committee recessed, subject to the call of the Chair.)

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